WHAT IS CLAIMED IS:

1. An electro-optical device for communicating with an optical disc, comprising:

a semiconductor chip having analog-to-digital conversion circuitry and logic circuitry contained therein;

first and second photodetectors on the semiconductor chip in electrical communication with the analog-to-digital conversion circuitry;

a laser diode supported by the semiconductor chip oriented to emit a laser beam in a first direction;

an optical unit supported above the semiconductor chip, the optical unit having a first mirror aligned to reflect the laser beam from the first direction to a second direction, a first lens for directing the laser beam outward to strike the surface of an optical disc, glass members for directing the laser beam from the second direction to the first lens, a second lens for receiving an information-containing beam from the optical disc, a second mirror for splitting the information-containing beam into first and second component beams, and a third mirror for directing the first component beam at the first photodetector, the second component beam passing through the second mirror in a direction at the second photodetector.

2. The electro-optical device of Claim 1 wherein the mirrors comprise titanium nitride films deposited on angled surfaces of the optical unit.

3. The electro-optical device of Claim 1 wherein the first mirror comprises aluminum and the second and third mirrors comprise an oxide, nitride, sulfide, or fluoride of a transition metal.

4. The electro-optical device of Claim 1 wherein the first lens extends inward from a first planar surface of the optical unit, and the second lens extends inward from a second planar surface of the optical unit, the first and second planar surfaces defining opposite sides of the optical unit.

5. The electro-optical device of Claim 4 wherein the first and second lenses each have curved surfaces that retain the same curvature in cross-sectional planes parallel to the opposed first and second planar surfaces.

6. The electro-optical unit of Claim 1 further comprising a fourth mirror for directing the laser beam from the second direction to a third direction at the second mirror.

7. The electro-optical unit of Claim 6 wherein the fourth mirror is formed in a slot in the optical unit.

8. An optical unit for directing light from a laser at an optical disc and directing light reflected from the optical disc at at least one photodetector, comprising:

a base element including a first mirror thereon for reflecting light from a first direction from the laser to a second direction; and

a lens element including second and third mirrors, the second mirror being positioned relative to the base element to reflect laser light from the second direction to a third direction, the third mirror being positioned relative to the second mirror to reflect laser light from the third direction to a fourth direction, the lens element further including first and second lenses at one end thereof, the first lens being disposed to direct laser light from the fourth direction at the optical disc, the second lens being disposed to receive light reflected from the optical disc and direct it at the third mirror, the third mirror being partially reflective to permit light to pass therethrough at a first photodetector, the third mirror comprising an oxide, nitride, sulfide, or fluoride of a transition metal.

9. The optical unit of Claim 8 wherein the third mirror comprises a titanium nitride film.

10. The optical unit of Claim 8 further comprising a fourth mirror positioned in the path of light partially reflected by the third mirror from the light returning from the optical disc, the fourth mirror reflecting light from the third mirror at a second photodetector spaced form the first photodetector.

11. The optical unit of Claim 10 wherein the second mirror extends part way through the lens element to permit light reflected by the third mirror returning from the optical disc to bypass the second mirror and strike the fourth mirror.

12. A method of making optical elements for an optical disc system, comprising:

providing a glass wafer of a diameter sufficiently large to form a plurality of lens elements side-by-side therein;

selectively etching a lens in each lens element;

selectively etching angled surfaces in each lens element;

depositing a reflective material on the angled surfaces;

selectively etching the outline of each lens element leaving rods connecting the lens elements to the wafer; and

cutting through the rods to separate the lens elements from the wafer.

13. The method of Claim 12 wherein the reflective material comprises an oxide, nitride, sulfide, or fluoride of a transition metal.

14. The method of Claim 13 wherein the reflective material comprises titanium nitride deposited to a thickness that forms partially reflective mirrors.

15. The method of Claim 12 wherein a second large-diameter glass wafer is provided to form a plurality of base elements, and the method includes:

selectively etching an angled surface on each base element;

depositing a second reflective material on the angled surface to provide a fully reflective mirror;

selectively etching the outline of each base element leaving rods connecting the base elements to the second wafer; and

cutting through the rods to separate the base elements from the second wafer.

16. The method of Claim 15 wherein the second reflective material comprises aluminum.

17. The method of Claim 15 further comprising assembling each lens element with a base element to align optical paths for light passing therethrough.

18. The method of Claim 12 wherein the lens is etched part way into a first side of the lens element, and further comprising selectively etching a second lens juxtaposed with the first-recited lens, the second lens being etched part way into the lens element from a side opposite from the first side to provide separate paths for light leaving the lens element and returning into the lens element.

19. An integrated optical unit for use with an optical disc, comprising:

a laser diode for generating a laser light beam;

a photodetector for detecting laser light returning from the optical disc; and

an optical unit having an elongated glass element for carrying light beams along its length, the elongated glass element having angled surfaces with mirrors formed thereon, the mirrors being positioned to direct a laser light beam from the laser diode along a first path through the elongated glass element and out at an optical disc, the mirrors reflecting a light beam returning from the optical disc along a second path through the elongated glass element parallel and adjacent to the first path for detection by the photodetector, wherein at least one of the mirrors comprises an oxide, nitride, sulfide, or fluoride of a transition metal.

20. The interdigitated optical unit of Claim 19 wherein the elongated glass element includes a first lens for directing the laser light beam out from the unit at the optical disc, and a second lens disposed adjacent to the first lens for receiving the returning light beam reflected from the optical disc.